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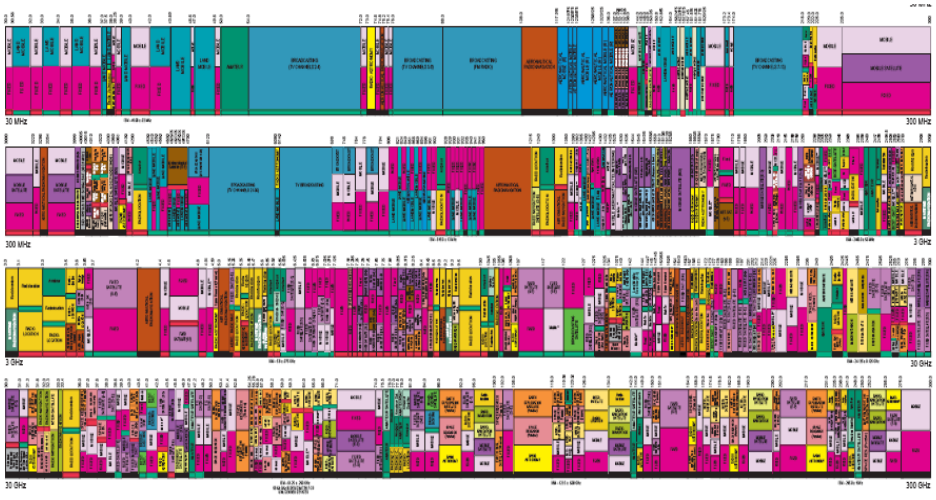
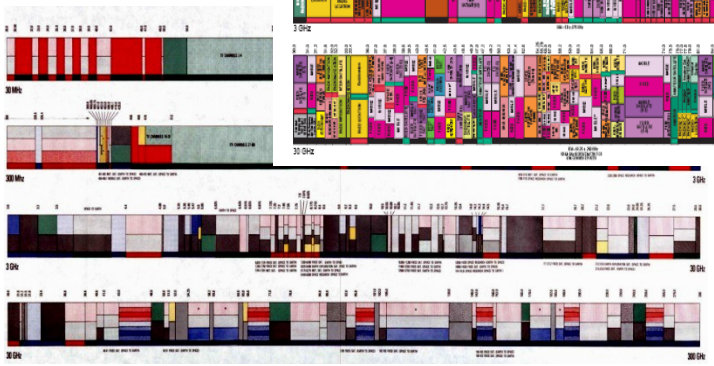
2010





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DoD – Long Term Spectrum Strategy (DoD - LTSS)

Defense Spectrum Organization
December 2011

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Background

- **Background**
  - Presidential Memorandum, *Unleashing the Wireless Broadband Revolution*, June 2010
    - Directs NTIA to collaborate with FCC to reach 500 MHz target in 10 years
    - Calls for R&D plan on *sharing techniques*
  - The Federal Communication Commission (FCC), *National Broadband Plan* (NBP), March 2010
    - 500 MHz of spectrum to be made available over 10 years
    - Expand opportunities for “innovative spectrum access models”
    - Further R&D of opportunistic uses across more radio spectrum
  - NTIA*, Plan and Timetable to Make Available 500 MHz of Spectrum for Wireless Broadband*, October 2010
    - Use modern technologies that mitigate interference and facilitate sharing of spectrum
  - The EM Spectrum is a finite resource that is increasingly becoming contested and congested with many competing user requirements
    - We need to assure warfighter access – national military strategy
    - We need to balance competing factors that include economic, technical and policy
- **Requirement**
  - DoD must develop and implement a comprehensive spectrum strategy that address the warfighters requirement for spectrum access and supports our overall national interest
- **Approach**
  - Develop a collaborative DoD focused strategy in parallel with actions that address current high priority spectrum issues that include developing implementation plans and providing execution support
  - The resulting strategy, implementation plan and execution support will constantly be evolving in “beta version”. Like cyberspace itself, the strategy and plan will always be changing — adjusting to new developments in technologies and markets

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The National Military Strategy of the United States of America

Global Commons and Globally Connected Domains – Assured access to and freedom of maneuver within the global
commons – shared areas of sea, air, space and Cyber

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BLUF

- DoD cannot afford to giveaway more exclusive rights to spectrum without a full appreciation of spectrum requirements
- The DoD needs to understand other spectrum stakeholder requirements
- The DoD – LTSS must be, flexible, comprehensive, defendable and collaborative
- Need to act on near term spectrum issues
- Spectrum must be part of a national net-centric strategy
- **DoD – LTSS effort must leverage technology in concert with developing a long term strategy**

The DoD must help shape the spectrum landscape

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DoD – LTSS Tenets

DoD must develop a strategy for spectrum use that includes:

- Assured spectrum access to meet mission/warfighter requirements
- Current and future DoD spectrum requirements
- **Application of technologies that allow greater sharing with commercial users**
- Clear implementation plan with measureable activities and periodic assessment of completion
- A near, mid and long-term construct
- Consideration of past efforts – Lessons learned

Spectrum When and Where Needed by the Warfighter

DoD Spectrum Availability Trends

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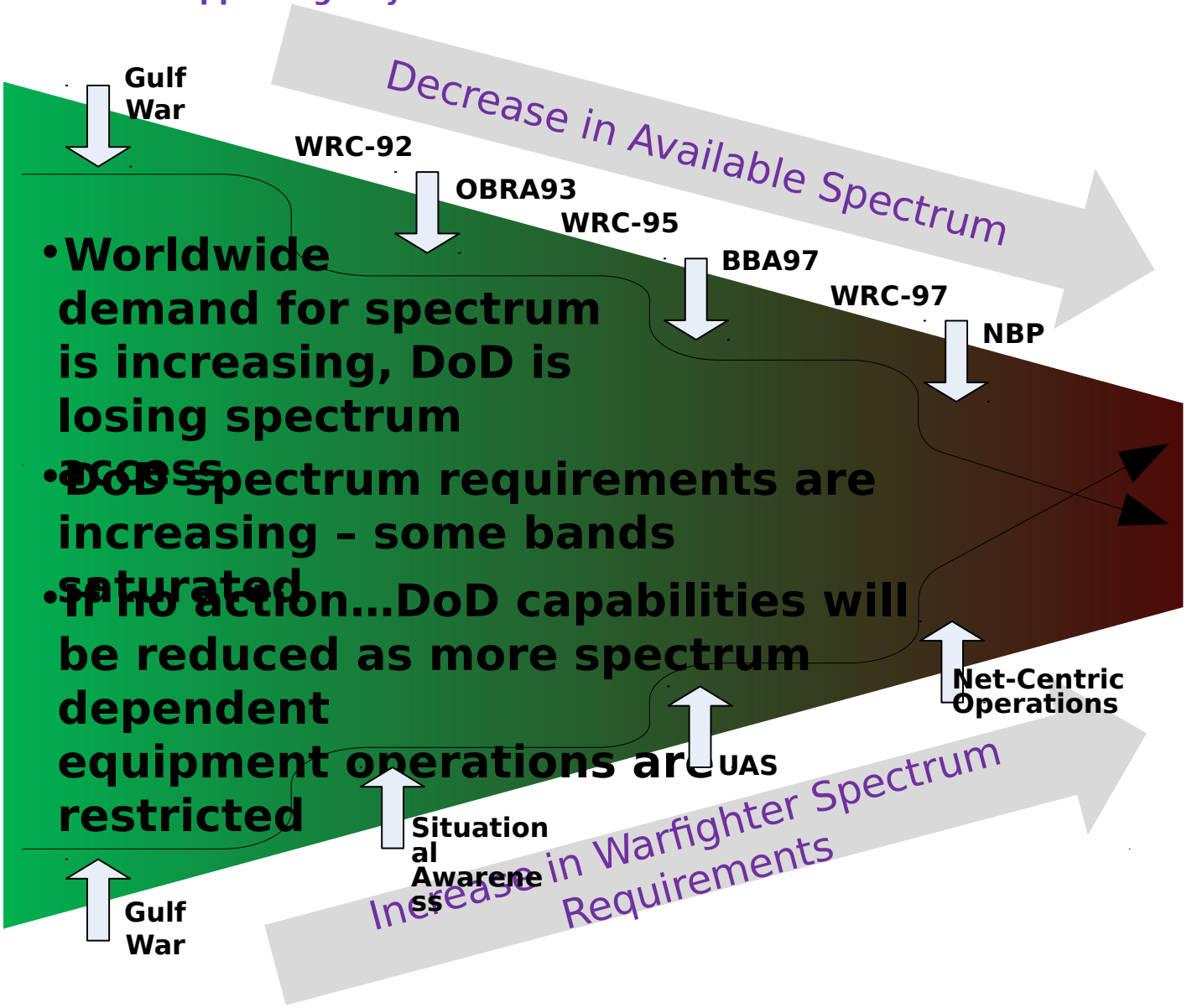

Technology may help change the shape of these curves

- Cognitive systems of systems
- Dynamic Spectrum Access (DSA)
- Multiuser Detection (MUD)
- Multiple Input Multiple Output (MIMO)
- Disruption Tolerant Networking (DTN)

“Prime Real Estate”

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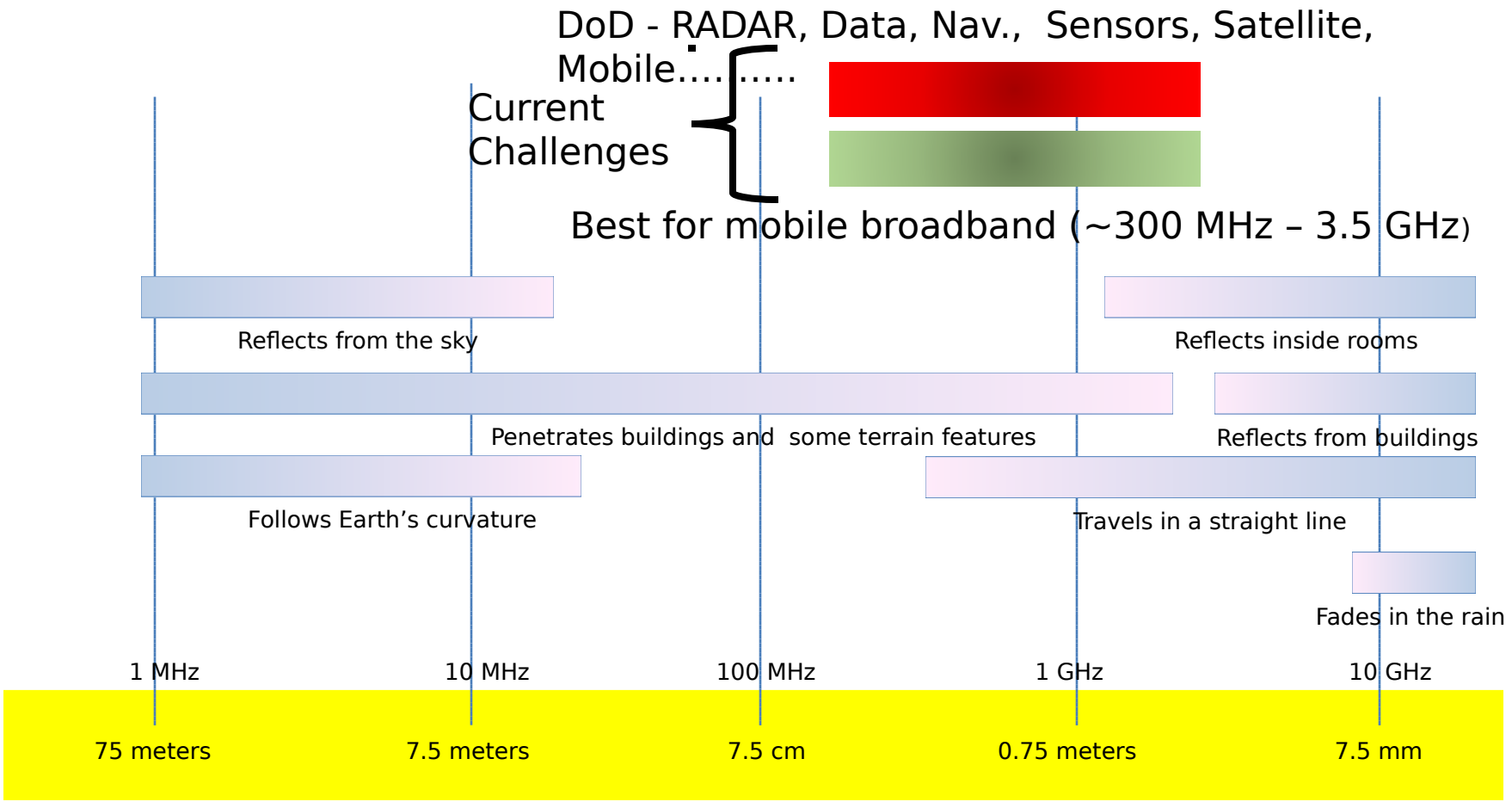
Limited Spectrum for Mobile Broadband



Opportunity Window: The best frequencies for mobile broadband are high enough that the antenna can be made conveniently compact yet not so high that signals will fall to penetrate buildings. This leaves a relatively narrow range of frequencies available for use (red band)

Spectrum - Conflicting Requirements

DoD Use Below 40 GHz

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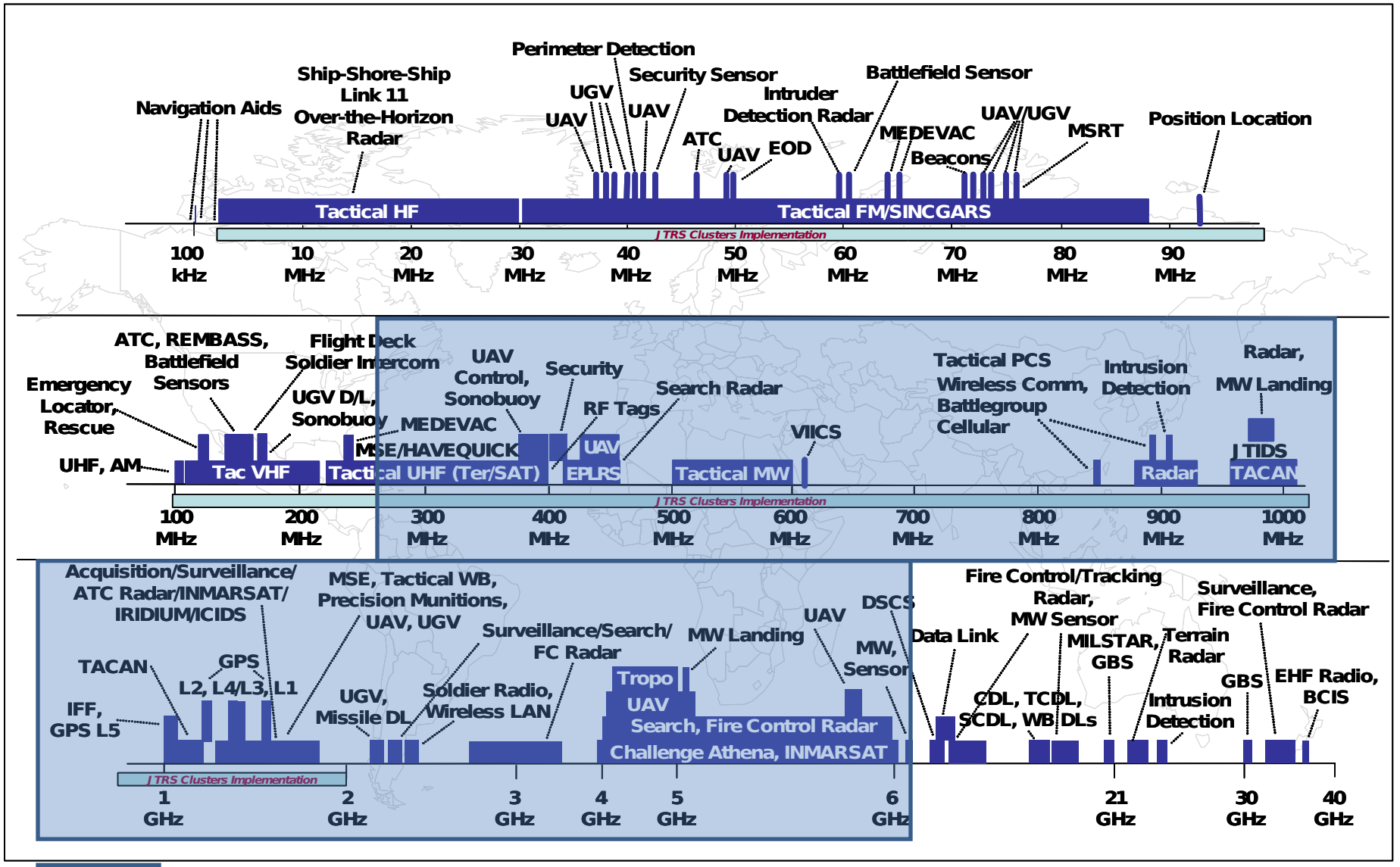

= Commercial interest

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Technology Focus

Technology focus areas the DoD team is researching:

- Communications Network Efficiency -- waveform and networking designs
- Integrated Spectrum Resource Management -- spectrum situational awareness and resource brokering
- Spectrum Sharing Capabilities -- enable government and commercial systems to share
- Exploit alternative spectrum -- new technologies that would allow moving higher in the spectrum
- Interference Mitigation and Hardening of DoD systems -- protect DoD systems from commercial in-band interference.
- DSA Technologies - Identifying/break down “roadblocks” for thorough testing
- Policy-based management rule sets to implement the Real-Time Spectrum Operations
- Wireless Technology Sandboxes -- Rapidly prototype and evaluate promising concepts and technologies for spectrum sharing and spectrum efficiency improvements

Strategic focus must be on additional R&D to adapt how DoD uses and coordinates spectrum

Leveraging expertise/capabilities from DARPA, MIT Lincoln Laboratory,
MITRE, DSO, others

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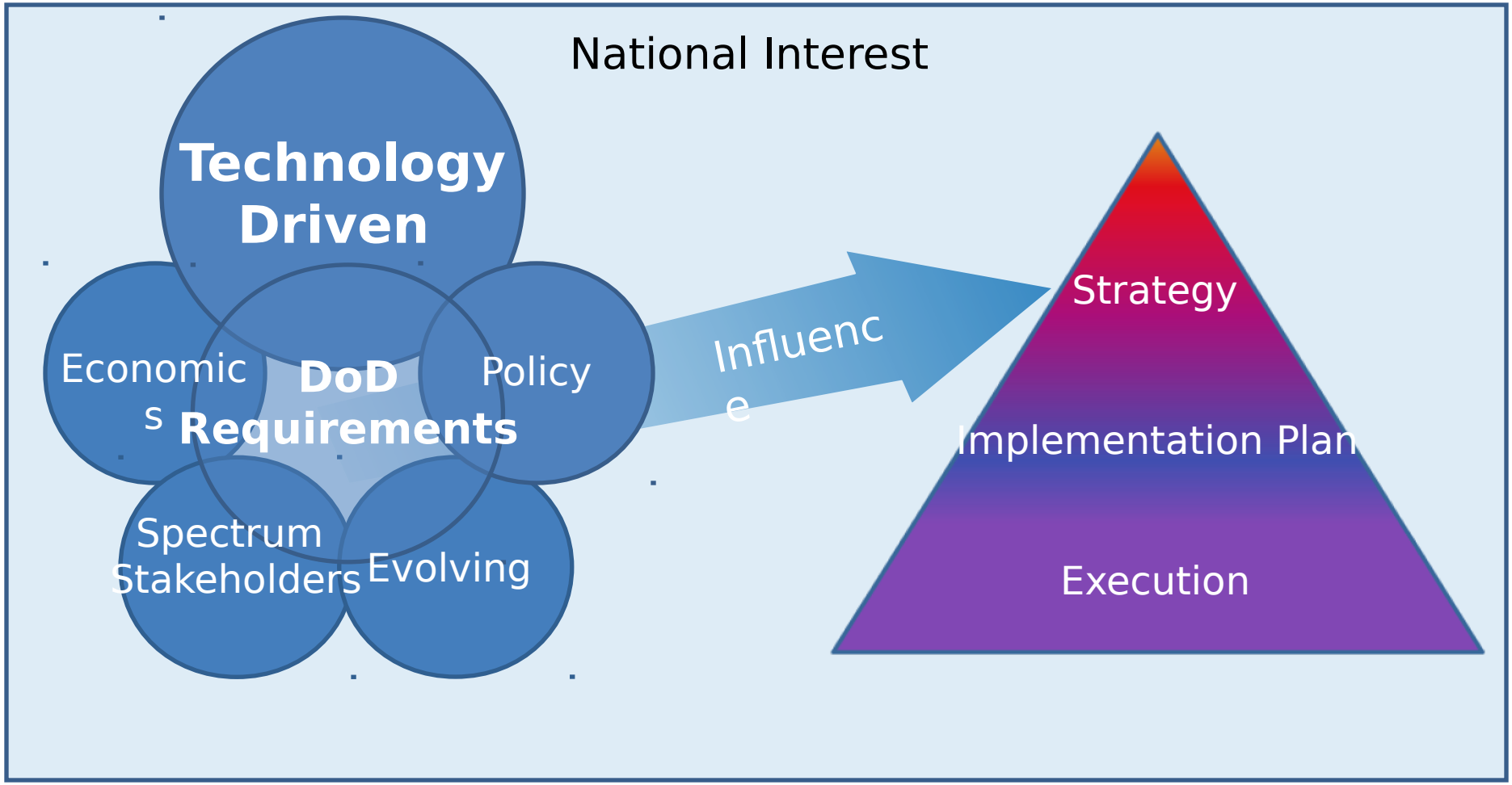
Strategy Development



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